LISTA 3 - PROBABILIDADE 1

(1)

a) $S = \{3, 4, 5, 6, 7, 8, 9, 10\}$
$S = \{x \in \mathbb{N} \mid 3 \leq x \leq 10\}$

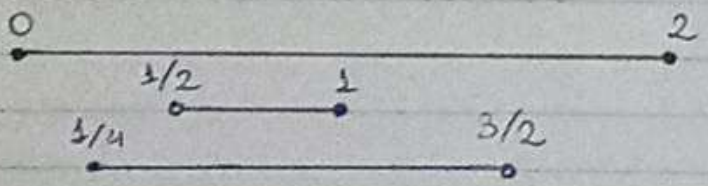
b) $S = \{(C,C,C,C); (C,C,C,K); (C,C,K,C); (C,K,C,C); (K,C,C,C); (C,C,K,K); (C,K,C,K); (K,C,C,K); (C,K,K,K); (K,C,K,K); (K,K,C,K); (K,K,K,C); (K,C,K,C); (K,K,C,C); (C,K,K,C); (K,K,K,K)\}$

c) $S = \{10, 11, 12, \ldots\}$
$S = \{x \in \mathbb{N} \mid x \geq 10\}$

d) $S = \{0, 1, 2, 3, \ldots\}$
$S = \{x \in \mathbb{N}\}$

(2)

$U = [x \mid 0 \leq x \leq 2]$
$A = [x \mid 1/2 < x \leq 1]$
$B = [x \mid 1/4 \leq x < 3/2]$



a) $\overline{A \cup B} = [x \mid 0 \leq x < 1/4 \in 3/2 \leq x \leq 2]$

b) $A \cup \overline{B} = [x \mid 0 \leq x < 1/4 \in 1/2 \leq x < 1 \in 3/2 \leq x \leq 2]$

c) $\overline{A \cap B} = [x \mid 0 \leq x \leq 1/2 \in 1 < x \leq 2]$

d) $\bar{A} \cap B = [x \mid 1/4 \leq x \leq 1/2 \in 1 < x < 3/2]$

③

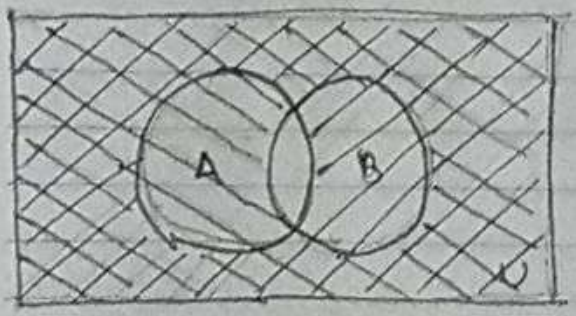
a) $S = [x \in \mathbb{N} \mid x \leq N - r]$

b) $S = [x \in \mathbb{N} \mid x \leq N]$

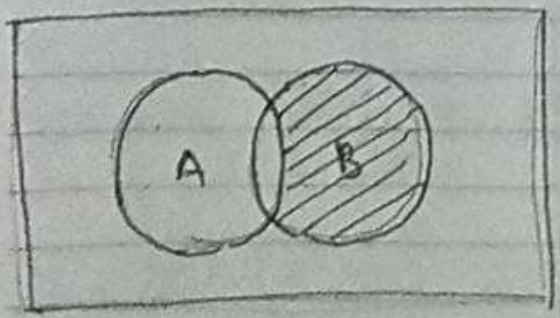
④

$\mathbb{P}(A) = x \longrightarrow \mathbb{P}(\bar{A}) = 1 - x$
$\mathbb{P}(B) = y \longrightarrow \mathbb{P}(\bar{B}) = 1 - y$
$\mathbb{P}(A \cap B) = z \longrightarrow \mathbb{P}(\overline{A \cap B}) = 1 - z$

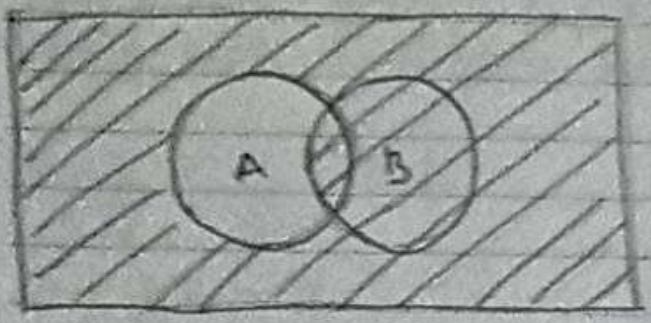
a) $\mathbb{P}(\bar{A} \cup \bar{B}) = \mathbb{P}(\overline{A \cap B}) = 1 - z$



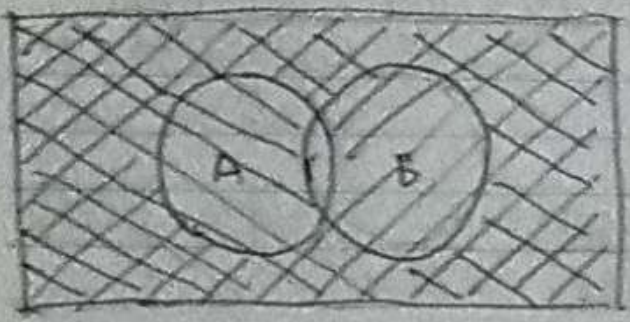
b) $\mathbb{P}(A \cap B) = \mathbb{P}(B) - \mathbb{P}(A \cap B) = y - z$



c) $P(\bar{A} \cup B) = P(\bar{A}) + P(A \cap B) = 1 - x + z$



d) $P(\bar{A} \cap \bar{B}) = 1 - [P(A) + P(B) - P(A \cap B)] = 1 - x - y + z$



(5)

a) $C_{1500,\,200} = \dfrac{1500!}{1300!\,200!}$

$C_{400,90} = \dfrac{400!}{310!\,90!}$

$C_{1100,110} = \dfrac{1100!}{990!\,110!}$

$P(x=90) = \dfrac{C_{400,90} \cdot C_{1100,110}}{C_{1500,200}}$

b) $P(x \geq 2) = 1 - P(x \leq 1) = 1 - [P(x=0) + P(x=1)]$

$$C_{1100,199} = \frac{1100!}{901!\,199!}$$

$$C_{400,1} = \frac{400!}{399!\,1!}$$

$$C_{1100,200} = \frac{1100!}{200!\,900!}$$

$$P(X \geq 2) = 1 - \left[\frac{C_{1100,200}}{C_{1500,200}} + \frac{C_{1100,199} \cdot C_{400,1}}{C_{1500,200}}\right]$$

⑥ $10+4+2 = 16$

a) $P(x \text{ NÃO TER DEFEITOS}) = \frac{10}{16} = \frac{5}{8}$

b) $P\left(x \text{ NÃO TER DEFEITOS GRAVES}\right) = \frac{10}{16} + \frac{4}{16} = \frac{14}{16} = \frac{7}{8}$

c) $P\left(x \text{ NÃO TER DEFEITOS OU TER DEFEITOS GRAVES}\right) = \frac{10}{16} + \frac{2}{16} = \frac{12}{16} = \frac{3}{4}$

⑦

	1	2	3	4	5	6
1	1,1	1,2	1,3	1,4	1,5	1,6
2	2,1	2,2	2,3	2,4	2,5	2,6
3	3,1	3,2	3,3	3,4	3,5	3,6
4	4,1	4,2	4,3	4,4	4,5	4,6
5	5,1	5,2	5,3	5,4	5,5	5,6
6	6,1	6,2	6,3	6,4	6,5	6,6

$\frac{11}{36}$

(8)

$P(x \text{ SER PAR}) = 1/x$

$P(x \text{ SER IMPAR}) = 1/2x$

$$3\left(\frac{1}{x} + \frac{1}{2x}\right) = 1$$

$$3 \cdot \left(\frac{2x + x}{2x^2}\right) = 1$$

$$\frac{3 \cdot 3x}{2x^2} = 1$$

$$9 = 2x$$

$$x = 9/2$$

$$P(x=5) = \frac{1}{2(9/2)} = \frac{2}{2 \cdot 9} = \frac{1}{9}$$